

Inclusive Teaching in a Pandemic: Quickly Switching Courses and Addressing New Problems

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Original problem: Finding ways to encourage students to participate in class discussions that accommodates their different needs.

Problems posed by pandemic

The course was going to be entirely online

- Synchronous courses are not always equitable for students
 - Time zone differences
 - Internet access issues
- Discussion online is difficult when students cannot see each other
 - The instructor should facilitate discussion, not participate
 - Most comments are directed at the instructor, if they occur

Conclusion: an asynchronous course is more equitable

The course was switched at the start of the enrollment period to avoid a discussion-based class.

Planned Course

Biol 655 Behavior Genetics
Prerequisite: Genetics
Undergraduate majors
Enrollment: 12-20
Times taught previously: 7
Discussion-based course using primary literature

Assignments:

- Class participation
- Leading journal article discussion
- Short written papers
- Final research presentation

Problems: Students are not always comfortable participating in the discussion

Course Taught

BIOL420 Biology of Sleep
Prerequisite: none
Undergraduate majors
Enrollment: 20-30
Times taught previously: 1

Assignments:

- Textbook readings
- Primary literature readings
- Data analysis
- Journal style paper on data analysis
- Infographic to reflect the necessity of sleep for a lay audience

Problems: Adjusting for equity given student diversity in resources for online education

Biology of Sleep



Implementation

Asynchronous weekly modules

For consistency, students had module assignments due on the same day and time each week, though no late penalties were given. Scaffolded projects ran simultaneously.

Module structure: Weeks 1-11

- Quiz on reading required to open
- Content:
 - Minilecture
 - Exercises
 - Guided readings
 - Discussion board

Project modules:

- Simultaneous with weekly modules (and only assignments due after week 11)
- Highly scaffolded
- Progressed from library research to writing
- Competency based
- Had minilectures illustrating how to do work



Data analysis project

To simulate a lab project, students collected data on themselves for a week each under three conditions

- 7-8 hours/night, same time to bed and awake each day (best sleep hygiene)
- 7-8 hours/night, any time to bed and awake each day (nominally enough sleep)
- Any amount of sleep each night, same total sleep during a week (poor sleep hygiene)

Students reported data on mood, stress, caffeine intake, how sleepy they felt during the day.

Data was anonymized before students picked a variable to analyze with respect to sleep hygiene treatment.*

Students reported demographic data for summary statistics to think about bias in sampling.

Equity and diversity through guided readings

Students vary in experience reading the primary literature (evidence: survey).

Journal articles readings had guided reading assignments.

Early assignments stepped students through parts of the paper

- Statements and graphs were explained
- Students wrote lay summaries to reflect understanding

Assignments progressed in complexity

- Students interpreted statements and graphs
- Students related papers to each other

Journal articles reflected a diversity of approaches

- Studies were based on populations of people other than US college students
- Pharmaceutical studies using traditional medicines were included

Student learning

Effects of asynchrony

Students struggled once they realized that due dates were relaxed. With an asynchronous course, they stopped working on the course when they had challenges from other courses.

The discussions each week fostered a sense of community. Students quickly learned who had the best posts and commented on their entries.

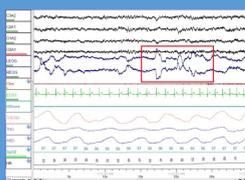
Project modules separate from weekly modules confused students. Links to the components of the projects due each week need to be embedded within the weekly module.

Final research papers

The data was rich enough that students had the ability to explore their own questions.

Students tended to pick questions that interested them without thinking about the scientific context.

Demographic data was awkward because of the difference between sex and gender. As a biology course, we were interested in sex but the term confuses students and can cause discomfort.



Guided readings

Students benefited from questions on readings and improved their ability over time.

Students had a bias favoring papers from labs in eastern countries, although the experimental design was better in the papers they were given from eastern countries.

Over time, students developed recognition that results are dependent on study populations and therefore understanding the demographics of the study group and the culture of sleep in the country should be considered.

Reflections

Asynchronous courses

Returning to in person classes should eliminate some of the challenges of students falling behind.

Students need to be held responsible for work before classroom meeting.

Discussion boards were successful at fostering community. They are worth trying as a regular weekly component even when meeting F2F.

A component added for a semi-asynchronous course (different topic) for Spring 2021 was weekly group work. The course had a scheduled time to meet and students were expected to join assigned groups each week.



Data analysis assignment in the future

Students had ownership of their projects by choosing what data to analyze.

Students struggle to set their research in the context of the literature.

More work needs to be done in advance to discuss issue in sleep hygiene.

The use of demographic data is probably not useful in this context, though students need to recognize that treatment groups should not differ.



Guided readings

Writing the guides takes excessive preparation

- Advantages: can be reused
- Disadvantages: reuse does not keep up with the literature
- However, the exercise helped identify ways to help students when discussing papers in person

Diversifying sources

Some critical lessons came through the use of a greater diversity of papers.

- Students have biases about the sources of papers.
- Students do not think critically about experimental design.



*The data indicate that there are significant differences in several measures between the good sleep hygiene and other sleep practices. Thus, even in this limited sample size, the clear take home message is that you should sleep regularly every single night.